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REMARKS

Reconsideration is respectfully requested in view of the amendments and remarks herein.

Office Action Paragraph 1

In paragraph 1 of the Action, the Action points out that WO 02/36862A1 is not in English. The Action refers to US2002/132116A1 as being an equivalent of WO0236862. Applicants also call the Patent Office's attention to US2002/130437A1, US2003/004301A1 and US6,667,096B2, which claim priority from the same German patent application.

Claims 1-42 stand rejected over Howell WO 96/00808 in view of Hwo US 2002/0130433, Wandel US 2002/0132116 and Sun US 2002/0147298. Applicants note that WO9600808 is a counterpart to US5662980 cited by Applicants on the form PTO/SB/08A.

Claim Rejection – 35 USC 103(a)

Claims 1-42 stand rejected under 35 USC 103(a) as obvious over WO 96/00808 Howell in view of US 2002/0130433A1 Hwo, US 2002 2002/0132116A1 Wandel and US 2002/0147209A1 Sun.

This invention is based upon the unexpected discovery that bulk continuous filament can be formed by a process wherein drawing the filaments is carried out at a speed of greater than 3000 meters per minute using poly(trimethylene terephthalate) having the claimed properties.

Applicants have amended the claims so that they are focused on forming a bulk continuous filament yarn at high speeds using poly(trimethylene terephthalate) having a number average molecular weight of about 26500 to about 40000, an intrinsic viscosity of about 0.95 to about 1.04 dl/g, and a melt viscosity of about 350 up to about 700 Pascals at 250°C and 48.65 per second shear rate. The claims recite that the drawing the filaments at a speed of greater than 3000 meters per minute.

Howell describes a process of preparing bulk continuous filament, but does not describe the process parameters or a preference for the poly(trimethylene terephthalate) of the claimed invention.

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Hwo is directed to a spin draw process for making partially oriented yarn. Yarn is drawn between a first godet pair and second pair of godets. According to paragraph 0009:

"The process may be operated wherein the first pair of godets is moving at greater than 3500 meters per minute. Then the speed of the second pair of godets is from 2450, preferably 2560, to 10,000 meters per minute and the temperature of the second pair of godets should be set to give a yarn temperature of PTT from 80 to 180°C. and the draw ratio should be 0.7 to 3.0, preferably 0.7 to less than 3.0, most preferably 0.95 to 2.0."

According to Table 1, the first pair of godets is operated at 1800-2500 meters per minute, and the second pair of godets is operated at 2800-3600 meters per minute. The poly(trimethylene terephthalate) IV is disclosed in paragraph 0025 as 0.92. According to Table 2, POY yarn count is less than 200 denier and denier per filament is less than 4.2.

Hwo does not teach anything concerning making bulk continuous filaments, or improvements to the process for making bulk continuous filaments that can be achieved using the claimed invention. Hwo's work is directed towards partially oriented yarns (POY) using spinning equipment typically used for POY. Unlike bulk continuous filament, additional drawing, heating and texturing steps would be needed to make textured yarn useful for apparel fabrics. Spinning POY followed by draw-texturing is a split process. Moreover, Hwo is assigned to Shell and Shell's U.S. 6,627,310 B2 to Lee et al. ("Lee"), discussed below, shows Shell bulked continuous process operating parameters, including a lower draw speed. Note that Lee was filed after Hwo.

Given the above, the person of ordinary skill in the art would not combine Hwo with Howell, with or without the other cited patent applications, to modify Howell's teachings with respect to bulk continuous filaments to arrive at the claimed invention.

Wandel is directed to a method of spinning, spooling and stretch texturing polyesters. This patent is focused on use of poly(trimethylene terephthalate) and poly(butylene terephthalate) so the teachings are more general than patents focused only on poly(trimethylene terephthalate). The patent (e.g., paragraph 0112) describes partially oriented yarn spooling speed for the POY of 2200-6000 meters

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per minute. However, the resultant partially oriented yarns are then stretch-textured at speeds of 500 meters per minute, preferably 700 meters per minute. (See, e.g., paragraphs 0134-0136.) Paragraph 0066 states that polyesters that have a limiting viscosity of 0.70 to 0.95 dl/g are particularly advantageous. Further, Examples 1-3 use poly(trimethylene terephthalate) chips having an IV of 0.93 dl/g and making POY yarn less than 103 denier and textured yarn less than 88 denier. The claimed invention is based upon the discovery that 0.95 to 1.04 IV are particularly advantageous in productivity for bulk continuous filament contrary to Wandel's findings. Given this, it can be seen that the claimed process is significantly different than the process described in Wandel and that there is nothing in Wandel that would lead the person of ordinary skill in the art to modify the process of Howell to arrive at the claimed invention.

Sun is directed to acid-dyeable polyester compositions comprising a polyester, such as poly(trimethylene terephthalate), and secondary amine or secondary amine salt. Paragraph 0085 states that bulk continuous filaments can be manufactured according to the techniques described in other documents, including U.S. counterparts to Howell (e.g., US 5,645,782). The Examples do not show manufacture of bulk continuous filaments. In addition, the drawing speeds seem to be much lower than claimed. For instance, the drawing speed described in Example 1 is 500 meters/minute. Thus, the person of ordinary skill in the art would not combine Sun with Howell, with or without the other cited patent applications, to arrive at the claimed invention.

Applicants direct the Examiner's attention to Shell's U.S. 6,627,310 B2 to Lee et al. ("Lee"), which shows bulked continuous process operating parameters used in a Shell patent, including a lower draw speed, and which includes examples that seem to have been run on the same equipment as used in the Examples of the instant patent application. Below is a process comparison between Lee's example and the invention Example 1.

	<u>Lee</u>	<u>Invention Example 1</u>
Polymer IV	0.92	1.03
Chip moisture, ppm	40	<50
Polymer melt temperature, °C	250	250
Number of spinneret hole (Cross-section)	68 holes (Y shape)	68 holes (Y shape)

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Modification ratio	2.0	2.0
Supplying roller, mpm (temperature, °C)	700 (60)	1970 (40)
Drawing roller, mpm (temperature, °C)	2300 (160)	3742 (165)
Bulking unit, °C	200	225
Cooling drum speed, mpm	-	60
Winder, mpm	1900	3015
BCF denier	1300	1242

A productivity increase of 63% from 2300 to 3742 mpm is significant in the bulk continuous filament carpet industry. It's surprising to find the magnitude is so dramatic and unexpected. At low IV (0.92), bulk continuous filament productivity is low and economically disadvantageous. At high IV (higher than 1.05), polymer becomes more expensive to make and polymer melt viscosity becomes higher than what today's bulk continuous filament remelt system is capable of processing without incurring excessive thermo-degradation. Therefore, 0.95 to 1.04 IV is found to be most economically advantageous in bulk continuous filament productivity and polymer manufacture.

For the above reasons, applicants submit that the person of ordinary skill in the art would not be led to the claimed invention by the teachings of Howell in view of Hwo, Wandel and Sun, and applicants respectfully request withdrawal of the rejection.

Amendments to the Claims

Claim 1 is amended to focus the claims on a process of forming a bulk continuous filament yarn as supported throughout the specification. The upper number average molecular is amended as supported in original claim 2. Intrinsic viscosity is recited as supported at page 7, second paragraph, and original claims 28 and 29. An upper range of melt viscosity is added as supported at page 7, second paragraph, and original claim 8. Claim 1 is also amended to recite a filament denier greater than 10, as supported at page 10, third paragraph from the bottom. In addition, the bulking step of original claim 21 is inserted into claim 1.

Claims 2, 5, 9-10, 18-19, 21, 28, 35, 39-40 are cancelled.

Claims 3, 6-7 and 31 are amended so that they are consistent with claim 1.

Claims 13 and 14 are amended to depend upon claims 47 and 56, respectively.

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Claims 22 and 23 are amended to depend upon claim 1, since the subject matter of claim 21 was inserted into claim 1.

Claims 26 and 27 are amended to depend upon claims 47 and 56, respectively.

Claims 29 and 30 are amended to depend from claim 1.

New claims 43 and 51 are based upon the disclosure at page 10, lines 11-15. Applicants submit that the disclosure supports the drawn speed being up to less than 5000 m/min.

Claim 44 is supported at page 7, second paragraph.

Claim 45 is supported at page 8, line 6.

Claim 46 is supported at page 7, second paragraph from the bottom.

Claim 47 is supported in original claim 1 and pages 9-10 of the specification, as well as the examples.

Claim 48 is supported at page 10, lines 5-6.

Claims 49 and 50 are supported at page 10, lines 12-14.

Claim 52 is supported at page 10, first paragraph.

Claims 53-54 are supported at page 7, second paragraph.

New claim 55 is supported at page 7, second paragraph from the bottom.

Claim 56 finds support as follows:

- (a) – Page 7, lines 20-22.
- (b) – Page 8, line 8.
- (c) – Page 10, line 7.
- (d) – Page 10, line 9.
- (e) – Page 10, first paragraph.
- (f) – Page 7, second paragraph.
- (g) – Page 7, second paragraph.
- (h) – Page 10, lines 23-25.
- (i) – Page 10, third paragraph.

Entry and consideration are respectfully requested.

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Conclusion

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

Should there remain any matters unresolved by this response, the Examiner is invited to telephone the undersigned at the below-listed direct-dial telephone number in order to expedite prosecution.

Respectfully submitted,



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